

IV. SOCIO-ECONOMIC ASSESSMENT OF THE 1988 OCEAN SALMON FISHERIES

Overview of 1988 Market Conditions

The prices received during 1988 for troll-caught chinook and coho salmon were generally higher than those received in 1987. At the start of the 1988 season, inventories of frozen salmon were very low. The low inventories combined with some small Alaska runs and a strong Japanese yen, provided an upward influence on prices offered for 1988 troll salmon. The strong 1987 prices continued in 1988 even though the cold storage inventories increased in the summer of 1988.

Imports and Competition from Pen-Reared Atlantic Salmon

Imports of fresh and frozen salmon, principally farmed Atlantic salmon, increased by 27 percent in volume, comparing imports through November 1987 with those through November 1988. This was an acceleration compared to the 8 percent increase in volume seen when comparing imports through November 1987 to the same period for 1986. The total value of imported fresh salmon increased by 38 percent, from \$81.6 million to \$112.9 million. Farmed salmon producers have had a significant impact on both the domestic and export frozen salmon market due to their ability to provide a steady supply throughout the year.

Norway remains the largest producer of pen-reared Atlantic salmon. However, 18 countries each exported more than 2,000 pounds of fresh and frozen salmon to the U.S. in 1988 (Table IV-1). For countries exporting most of the fresh salmon product to the U.S., the port of entry average customs value for fresh and frozen salmon, not including duties, insurance, and freight, ranged from about \$2.73 per pound (Canada) to \$4.40 per pound (United Kingdom). Norway's average price increased from \$3.31 to \$3.57 per pound. Farmed salmon prices in Norway, down in 1986 in part due to overproduction, increased in 1987 and 1988.

Exports and Strength of the U.S. Dollar Relative to Foreign Currencies

In 1988, the U.S. dollar continued to weaken against major currencies although at a much slower pace than in 1987. This trend helped to maintain the U.S. position in salmon export markets despite high prices. Export volumes of all salmon products were up 9 percent, while value increased by 36 percent (Table IV-2). Average nominal prices were up for all salmon product categories except for "canned sockeye," but volume decreased slightly for fresh or frozen silvers, sockeye and "others," as well as fillets. Purchases by Japan appear to have accounted for most of the increase in product volume and value (Table IV-2).

Competition from Alaskan Salmon

West coast chinook and coho compete directly with Alaskan chinook and coho in the market place. Because of cross price effects, Alaskan harvests of all salmon species compete indirectly with west coast salmon in the fresh market, so that decreases in the volume of Alaskan salmon have an upward influence on the ex-vessel price received for west coast troll salmon. After 8 years of Alaskan harvests in excess of 100 million salmon, landings dropped below that

Table IV-1. Major U.S. imports of fresh salmon by country, through November 1987 and 1988.

Country of Origin ^{a/}	Through Nov. 1987		Through Nov. 1988	
	Thousands of Pounds	Thousands of Dollars	Thousands of Pounds	Thousands of Dollars
Argentina	2	\$ 3	0	\$ 0
Australia	2	6	3	7
Belgium & Luxembourg	5	22	1	15
British Virgin Islands	0	0	3	9
Canada	7,938	17,759	13,220	36,126
Chile	1,650	3,501	2,490	6,364
China	2	5	4	19
Columbia	2	7	0	0
Denmark	680	2,139	132	476
Ecuador	7	12	9	24
Finland	2	10	0	0
France	5	19	0	0
French Indian Ocean	0	0	2	6
Iceland	148	594	632	2,307
Ireland	102	393	584	2,256
Israel	0	0	2	6
Italy	5	20	0	0
Macao	41	143	0	0
Nepal	0	0	7	29
Netherlands	135	505	99	335
New Zealand	226	677	114	374
Norway	15,353	50,882	17,116	61,153
Panama	6	25	0	0
Sweden	141	283	8	26
Switzerland	32	62	0	0
Taiwan	0	0	1	4
United Kingdom	1,191	4,542	760	3,347
West Germany	0	4	3	7
Total ^{b/}	27,676	\$81,620	35,190	\$112,892

a/ Countries exporting over 2,000 pounds of fresh salmon to the United States through November 1987 or 1988. Countries added in 1988 were Israel, Nepal, French Indian Ocean area, and the British Virgin Islands. Portugal was dropped from the list in 1988.

b/ All countries, including those exporting less than 2,000 pounds to the United States.

Table IV-2. Major U.S. exports of fresh salmon, by country and Japan, prior and current year through November 1988.

	Through Nov. 1987		Through Nov. 1988	
	(thousands of)		(thousands of)	
	Pounds	Dollars	Pounds	Dollars
<u>ALL COUNTRIES</u>				
Chinook Fresh Chilled or Frozen	9,313	\$ 29,889	10,134	\$ 35,906
Chum Fresh Chilled or Frozen	39,471	55,491	54,032	103,410
Pink Fresh Chilled or Frozen	34,218	45,635	51,604	88,142
Silver Whole or Eviscerated Fresh or Frozen	20,299	48,030	19,061	58,920
Sockeye Fresh Chilled or Frozen	137,463	366,283	137,379	491,906
Other Fresh Chilled or Frozen	19,536	40,803	13,317	31,809
Filletts Steaks Portions Fresh or Frozen	1,849	4,130	1,511	4,127
Dried Salted Smoked	264	1,059	251	1,109
Canned Chum	2,007	2,738	980	2,256
Canned Pink	13,495	24,420	10,927	25,571
Canned Sockeye	8,693	29,578	10,323	32,847
Canned Other	2,952	6,117	5,618	17,862
Roe	16,478	69,394	17,232	86,771
TOTAL ALL COUNTRIES	306,038	\$723,567	332,369	\$980,636
<u>JAPAN</u>				
Chinook Fresh Chilled or Frozen	7,067	\$ 24,404	7,865	\$ 29,315
Chum Fresh Chilled or Frozen	17,923	22,997	35,191	64,273
Pink Fresh Chilled or Frozen	20,813	25,842	38,554	63,520
Silver Whole or Eviscerated Fresh or Frozen	9,325	18,866	12,691	40,044
Sockeye Fresh Chilled or Frozen	129,114	343,184	133,747	481,069
Other Fresh Chilled or Frozen	8,102	16,592	7,514	17,637
Filletts Steaks Portion Fresh Chilled or Frozen	1,169	2,593	403	950
Dried Salted Smoked	31	135	121	551
Canned Chum	10	17	2	19
Canned Pink	1	4	22	38
Canned Sockeye	251	753	256	861
Canned Other	32	27	293	718
Roe	16,013	66,218	16,601	82,591
TOTAL JAPAN	209,851	\$521,632	253,260	\$781,586

level for the second year in a row (95.3 million in 1987 and 99 million in 1988). The relatively low volume has helped to keep prices high in the west coast fisheries.

Ex-vessel Prices and Values for the 1988 Ocean Troll Fishery

Seasonal Trends

California

The monthly average ex-vessel prices for California, presented in Table IV-3, are based on market order prices and most likely reflect the minimum price received.

Information on prices paid by market category was unavailable. The values presented are the average price paid per month for all troll-caught chinook and coho landed. These prices are a function of the distribution of the catch among market categories, particularly for chinook.

Oregon

Monthly average prices received by size category are shown in Table IV-4.

Prices for all graded chinook increased steadily through the season. As an example, monthly average large chinook prices:

- began the season at \$2.87 per pound in May,
- increased each month, and
- ended with a season high of \$4.25 per pound in November.

The majority of coho are bought as a mixed grade. Mixed coho monthly average per pound prices:

- began the season at \$2.02 per pound in June,
- increased each month, and
- ended at \$2.50 in August.

Washington

The monthly average ex-vessel price per pound received for troll-caught chinook and coho landed in Neah Bay, Westport, and Ilwaco is shown in Table IV-5. As with California, information on prices paid by market category was unavailable, and the average price for all troll-caught chinook and coho landed are a function of distribution of the catch among market categories, particularly for chinook.

Annual Trends

Available information on salmon ex-vessel price and value by species, compiled from state fish tickets and expressed both in nominal terms and real 1988 dollars, is presented in Tables IV-6, IV-7, and IV-8. Trends in ex-vessel value landed from 1979-1988 are shown in Figure IV-1. The implicit price deflator published by the Bureau of Economic Analysis is used to adjust nominal to real values.

Table IV-3. Average monthly ex-vessel salmon price in dollars per pound, for California in 1988.

	May	June	July	Aug.	Sept.
Chinook ^{a/}	2.62	2.82	2.88	3.16	3.55
Coho	-	2.14	2.24	2.47	2.31

a/ Chinook salmon are typically sold in 2 and sometimes 3 size categories. Prices paid in these categories are not extracted from dealer ticket information.

Table IV-4. Average monthly ex-vessel salmon price, for 1988, Oregon.

	Ex-vessel Price Per Pound							
	May	June	July	Aug.	Sept.	Oct.	Nov.	Season
<u>Chinook</u>								
Large (>11 pounds)	2.87	3.08	3.26	3.49	3.55	3.86	4.25	3.28
Medium (7-11 pounds)	2.52	2.69	2.95	3.49	3.57	3.58	3.99	3.01
Small (<7 pounds)	2.15	2.58	2.96	3.50	3.58	3.59	3.78	2.92
Ungraded Chinook	3.19	3.02	3.14	3.51	3.58	3.60	3.73	3.37
<u>Coho^{a/}</u>								
Mixed Coho	-	2.02	2.12	2.50	-	-	-	2.28

a/ Minimal landings of graded coho were reported. Out of total landings of 1,915,589 pounds, 13 pounds were large coho and 845 pounds were medium coho.

Table IV-5. Average monthly nontreaty troll salmon prices, for 1988 at Neah Bay, Westport, and Ilwaco, Washington.

Area	May	June	July	Aug.	Sept.
<u>CHINOOK</u>					
Neah Bay	2.92	3.30	-	-	-
Westport	2.66	2.79	-	-	-
Ilwaco	2.65	2.74	-	-	-
<u>COHO</u>					
Neah Bay			NO SEASON		
Westport			NO SEASON		
Ilwaco			NO SEASON		

Table IV-6. Estimates of ex-vessel value (in dollars) of California troll salmon landings and average price (dollars per pound),^{a/} 1979-1988.

Year	Chinook					Coho				Total	
	GNP	Nominal	Real ^{b/}	Nominal	Real ^{b/}	Nominal	Real ^{b/}	Nominal	Real ^{b/}	Nominal	Real ^{b/}
	Price Deflator			Price Per Pound	Price Per Pound			Price Per Pound	Price Per Pound		
		Value	Value			Value	Value			Value	Value
1979	64.4	\$17,356,000	\$26,947,000	\$2.53	\$3.93	\$2,303,000	\$3,575,600	\$2.19	\$3.40	\$19,659,000	\$30,522,600
1980	70.6	12,741,000	18,037,000	2.27	3.21	408,000	557,600	1.36	1.93	13,149,000	18,614,600
1981	77.3	13,417,000	17,351,200	2.25	2.91	905,000	1,170,400	1.94	2.51	14,322,000	18,521,500
1982	82.2	18,754,000	22,823,600	2.55	3.10	735,000	894,500	1.36	1.66	19,489,000	23,718,100
1983	85.1	4,290,000	5,040,300	2.09	2.46	318,000	373,600	1.25	1.47	4,608,000	5,413,900
1984	88.7	6,875,000	7,754,300	2.67	3.01	687,000	774,900	1.99	2.24	7,562,000	8,529,200
1985 ^{c/}	91.6	11,390,000	12,432,000	2.56	2.79	125,000	136,400	1.57	1.71	11,535,000 ^{d/}	12,590,200 ^{d/}
1986	94.1	14,874,000	15,809,300	2.01	2.14	238,000	253,000	1.18	1.25	15,112,000	16,062,300
1987	96.5	25,130,000	26,028,300	2.78	2.88	493,000	510,600	2.00	2.07	25,623,000 ^{e/}	26,538,900 ^{e/}
1988 ^{c/}	100.0	40,922,000	40,922,000	2.85	2.85	707,000	707,000	2.21	2.21	41,629,000	41,629,000

a/ Dressed weight value (preliminary).

b/ Expressed in 1988 dollars.

c/ Preliminary.

d/ Does not include pink landings with a nominal ex-vessel value of \$20,000. Nominal pink price per pound was \$0.50.

e/ Does not include pink landings with a nominal ex-vessel value of \$2,500. Nominal pink price per pound was \$1.38.

Table IV-7. Oregon estimates of salmon ex-vessel value (in dollars) troll landings and average price (dollars per pound)^{a/} in 1971-1988.

Year	GNP Price Deflator	Chinook				Coho				Total	
		Nominal Value	Real ^{b/} Value	Nominal Price	Real ^{b/} Price	Nominal Value	Real ^{b/} Value	Nominal Price	Real ^{b/} Price	Nominal Value	Real ^{b/} Value
				Per Pound	Per Pound			Per Pound	Per Pound		
1971	37.9	\$ 587,000	\$ 1,547,600	\$0.59	\$1.56	\$ 3,155,000	\$ 8,317,900	\$0.36	\$0.95	\$ 3,742,000	\$ 9,865,500
1972	39.6	982,000	2,481,100	0.75	1.89	2,476,000	6,255,800	0.51	1.29	3,458,000	8,736,900
1973	41.8	3,520,000	8,425,500	1.02	2.44	4,004,000	9,584,000	0.78	1.87	7,524,000	18,009,400
1974	45.4	2,412,000	5,307,800	1.05	2.31	5,525,000	12,158,100	0.76	1.67	7,937,000	17,465,900
1975	49.7	2,680,000	5,397,000	1.04	2.09	3,128,000	6,299,200	0.77	1.55	5,808,000	11,696,200
1976	52.2	3,410,000	6,529,700	1.77	3.39	11,458,000	21,940,700	1.26	2.41	14,868,000	28,470,400
1977	55.2	7,938,000	14,368,400	2.17	3.93	3,546,000	6,418,600	1.34	2.43	11,484,000	20,787,000
1978	59.3	3,584,000	6,046,200	1.89	3.19	3,756,000	6,336,300	1.35	2.28	7,340,000	12,382,500
1979	64.4	6,639,000	10,307,700	2.57	3.99	10,350,000	16,069,400	2.26	3.51	16,989,000	26,377,200
1980	70.6	5,259,000	7,445,000	2.42	3.43	2,926,000	4,142,200	1.34	1.90	8,185,000	11,587,200
1981	77.3	4,039,000	5,223,300	2.57	3.32	5,534,000	7,156,700	1.66	2.15	9,573,000	12,380,000
1982	82.2	6,094,000	7,416,400	2.59	3.15	3,801,000	4,625,800	1.40	1.70	9,895,000	12,042,200
1983	85.1	1,244,000	1,461,600	1.90	2.23	1,052,000	1,236,000	0.96	1.13	2,296,000	2,697,600
1984	88.7	1,477,000	1,665,900	2.74	3.09	118,000	133,100	1.66	1.87	1,595,000	1,799,000
1985	91.6	5,045,000	5,506,500	2.48	2.71	729,000	795,700	1.51	1.65	5,774,000 ^{d/}	6,302,200 ^{d/}
1986	94.1	5,976,000	6,351,800	1.77	1.88	1,978,000	2,102,400	1.04	1.11	7,954,000	8,454,200
1987 ^{c/}	96.5	13,467,000	13,948,400	2.60	2.69	3,296,000	3,413,800	1.72	1.78	16,763,000 ^{e/}	17,362,200 ^{e/}
1988 ^{c/}	100.0	13,940,000	13,940,000	3.19	3.19	7,596,000	7,596,000	2.28	2.28	21,536,000	21,536,000

a/ Dressed weight.

b/ Expressed in 1988 dollars.

c/ Preliminary.

d/ Does not include pink landings with a nominal ex-vessel value of \$168,000. Nominal pink price per pound was \$0.65.

e/ Does not include pink landings with a nominal ex-vessel value of \$69,000. Nominal pink price per pound was \$0.79.

Table IV-8. Washington estimates of salmon ex-vessel value (in dollars) nontreaty troll landings and average price (dollars per pound),^{a/} 1971-1988.

Year	GNP Price Deflator	Chinook				Coho				Total	
		Nominal Value	Real ^{b/} Value	Nominal	Real ^{b/}	Nominal Value	Real ^{b/} Value	Nominal	Real ^{b/}	Nominal Value	Real ^{b/} Value
				Price	Price			Price	Price		
				Per Pound	Per Pound			Per Pound	Per Pound		
1971	37.9	\$1,654,000	\$ 4,360,600	\$0.62	\$1.63	\$2,477,000	\$ 6,530,400	\$0.36	\$0.95	\$ 4,131,000	\$10,891,100
1972	39.6	1,709,000	4,317,900	0.72	1.92	1,959,000	4,949,600	0.58	1.46	3,668,000	9,267,500
1973	41.8	3,480,000	8,329,700	1.05	2.51	3,112,000	7,448,900	0.83	1.99	6,592,000	15,778,600
1974	45.4	3,794,000	8,348,900	1.00	2.20	4,272,000	9,400,800	0.76	1.67	8,066,000	17,749,800
1975	49.7	2,935,000	5,910,500	1.02	2.05	3,481,000	7,010,000	0.79	1.59	6,416,000	12,920,500
1976	52.2	6,034,000	11,554,400	1.59	3.04	7,790,000	14,916,900	1.25	2.39	13,824,000	26,471,300
1977	55.2	6,170,000	11,168,200	2.17	3.93	4,770,000	8,634,100	1.28	2.32	10,940,000	19,802,300
1978	59.3	4,872,000	8,219,000	2.35	3.96	5,153,000	8,693,000	1.84	3.10	10,025,000	16,912,000
1979	64.4	5,501,000	8,540,900	3.24	5.03	9,590,000	14,889,500	2.40	3.73	15,091,000	23,430,300
1980	70.6	3,989,000	5,647,100	2.62	3.71	3,125,000	4,424,000	1.59	2.25	7,114,000	10,071,100
1981	77.3	3,279,000	4,240,500	2.66	3.44	2,642,000	3,416,700	1.52	1.97	5,921,000	7,657,200
1982	82.2	4,246,000	5,167,400	2.57	3.13	2,484,000	3,023,000	1.34	1.63	6,730,000	8,190,400
1983	85.1	1,152,000	1,353,500	1.72	2.02	313,000	367,700	0.93	1.09	1,465,000	1,721,200
1984	88.7	255,000	287,600	2.78	3.14	155,000	174,800	1.48	1.67	410,000	462,400
1985	91.6	837,000	913,600	2.57	2.81	764,000	833,900	1.32	1.44	1,601,000 ^{d/}	1,747,500 ^{d/}
1986 ^{c/}	94.1	808,000	858,800	2.35	2.50	368,000	390,100	1.16	1.23	1,175,000	1,248,900
1987 ^{c/}	96.5	1,606,000	1,662,900	2.97	3.08	354,400	367,100	1.67	1.73	1,960,000 ^{e/}	2,030,000 ^{e/}
1988 ^{c/}	100.0	2,289,000	2,289,000	2.95	2.95	48,100 ^{f/}	48,100	2.45	2.45	2,337,100	2,337,100

a/ Dressed weight.

b/ Expressed in 1988 dollars.

c/ Preliminary.

d/ Does not include pink landings with a nominal ex-vessel value of \$308,000. Nominal pink price per pound was \$0.55.

e/ Does not include pink landings with a nominal ex-vessel value of \$6,500. Nominal pink price per pound was \$0.62.

f/ Value for landings of fish caught south of Cape Falcon and seizures of illegal fish.

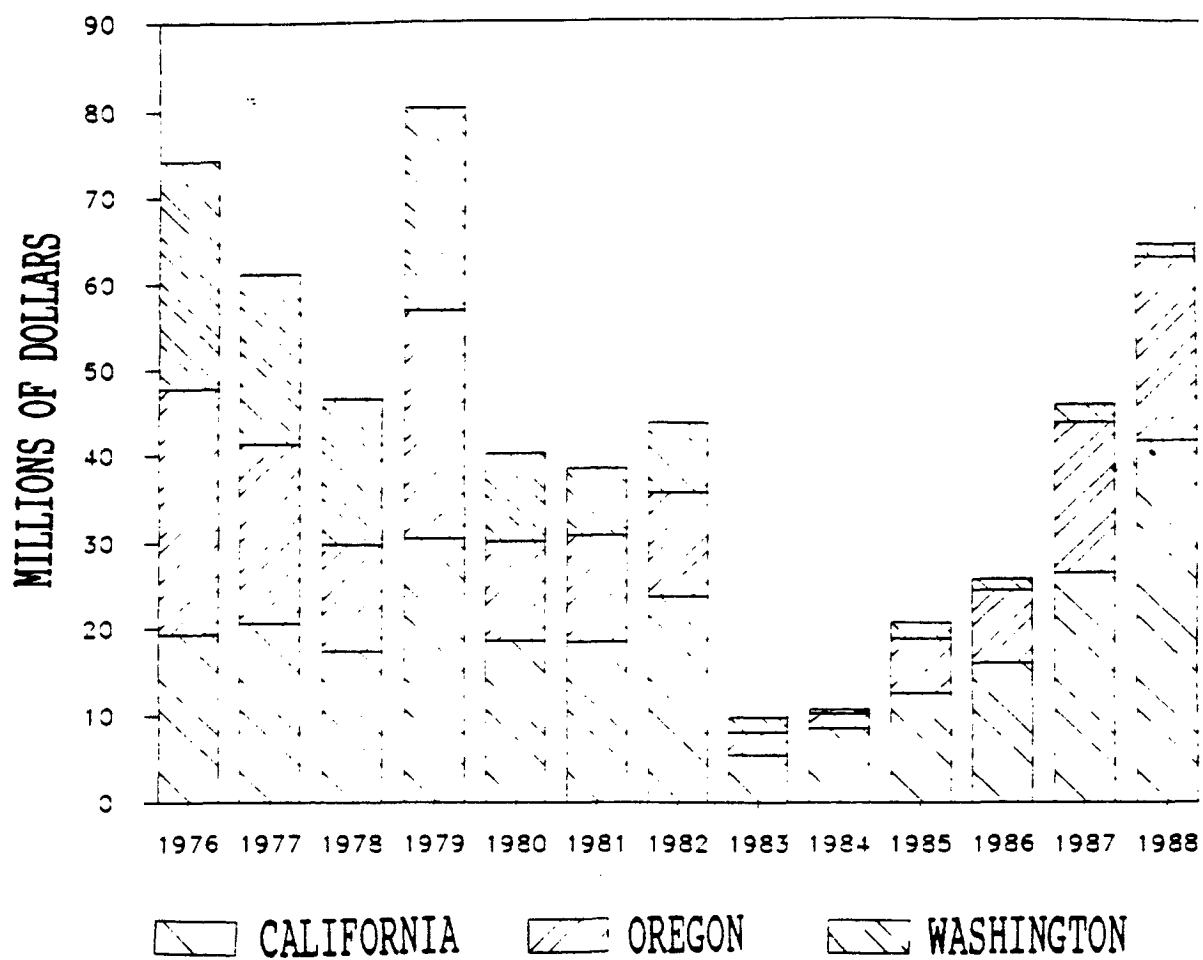


Figure IV-1. Ex-vessel value of troll landings (1988 dollars).

In the 1988 west coast nontreaty troll fishery, Council management areas and associated state territorial waters:

- o total ex-vessel value was \$65,502,100 (up 43 percent over 1987),
- o total pounds of chinook landed were 19,494,900 (up 32 percent over 1987),
- o total pounds of coho landed were 3,671,900 (up 54 percent over 1987).

The percent increases in ex-vessel value were more than proportional to the increase in weight due to increased ex-vessel prices.

California

California ocean troll, 1988 (Table IV-6):

- o total value \$41,629,000
- o 57 percent real increase relative to 1987
- o 129 percent above the 1976-1987 average

Chinook harvest and value, 1988:

- o 14,351,600 pounds (59 percent increase over 1987)
- o average price, \$2.85 (1 percent below the 1987 real price)
- o \$40,922,000 ex-vessel value (57 percent increase over 1987)

The increase in the number of pounds landed more than offset the slight decline in price. Part of the increase in number of pounds landed was due to the increase in the average weight of the fish.

Average dressed weight of chinook:

- o 11.0 pounds
- o 0.8 pounds more than the 1987 average dressed weight (Appendix D, Table D-1)

Coho harvest and value, 1988:

- o 319,800 pounds (30 percent increase over 1987)
- o average price \$2.21 (7 percent above the 1987 real price)
- o \$707,000 ex-vessel value (38 percent increase over 1987)

Both the average ex-vessel price and the number of pounds harvested increased. The increase in the number of pounds was in part due to an increase in average weights.

Average dressed weight of coho:

- o 6.3 pounds
- o 0.7 pounds more than the 1987 average dressed weight (Appendix D, Table D-1)

Oregon

Oregon ocean troll value, 1988 (Table IV-7):

- o total value \$21,536,000
- o 24 percent real increase relative to 1987
- o 61 percent above the 1976-1987 average.

Chinook harvest and value, 1988:

- o 4,366,100 pounds (16 percent below 1987)
- o average price, \$3.19 (18 percent above the 1987 real price)
- o \$13,940,000 ex-vessel value (virtually unchanged compared to 1987)

The decrease in total pounds landed was almost exactly offset by the increase in average price. The decrease in the weight landed was greater than the decrease in total catch because of a decline in the average weight of the fish.

Average dressed weight of chinook:

- o 9.3 pounds
- o 0.5 pounds less than the 1987 average dressed weight (Appendix D, Table D-2)

Coho harvest and value, 1988:

- o 3,332,500 pounds (74 percent above 1987)
- o average price \$2.28 (28 percent above the 1987 real price)
- o \$7,596,000 ex-vessel value (123 percent increase over 1987)

Both the average ex-vessel price and the number of pounds harvested increased. Part of the increase in the number of pounds of coho was due to an increase in average weights.

Average dressed weight of coho:

- o 5.4 pounds
- o the same as the 1987 average dressed weight (Appendix D, Table D-2)

Washington

Washington nontreaty ocean troll, 1988 (Table IV-8):

- o total value \$2,337,000
- o 15 percent real increase relative to 1987
- o 77 percent below the 1976-1987 average

Ninety-eight percent of the total value came from chinook as there was no coho harvest north of Cape Falcon.

Chinook harvest and value, 1988:

- o 776,300 pounds (39 percent increase compared to 1987)
- o average price, \$2.95 (4 percent decrease compared to the 1987 real price)
- o \$2,289,100 ex-vessel value (38 percent increase compared to 1987)

Even though all chinook were harvested in the spring, there was a slight increase in average weights due to greater numbers of age-4 chinook relative to the numbers of age-3 chinook.

Average dressed weight of chinook:

- o 10.6 pounds
- o 1.1 pounds more than the 1987 average dressed weight (Appendix D, Table D-3)

Coho landings north of Cape Falcon were from coho harvested south of Cape Falcon and seizures of illegal fish.

Trends in Ocean Troll Effort

Total Effort Employed in the Troll Fishery

The number of vessels active in the 1988 non-Indian troll fishery:

- o California - 2,562 of 3,493 holding permits, an increase of 5 percent
- o Oregon - 2,053 of 2,582 holding permits, a decrease of 3 percent
- o Washington - 650 of 1,294 holding permits, a decrease of 26 percent

Tables D-4, D-5, and D-6 in Appendix D show trends in total fleet size in recent years.

Other Effort Related Information

Historical information on landings by vessel size class, percentages of the fleet responsible for the majority of harvest, and harvest by residence of vessels participating in the fishery off each state is provided in Appendix D. In addition, an approximation of ex-vessel value by vessel size and port of landing for California and Washington ports can be found in Appendix D, Tables D-10 and D-11.

Columbia River Fishery

Events in the ocean troll and recreational fisheries impact inriver fisheries in terms of increased or decreased fishing opportunity. Information is presented below and in Table IV-9 on the ex-vessel value of inriver commercial harvest of Columbia River chinook and coho in 1988.

Ex-vessel Prices

Ex-vessel prices for inriver gillnet catches of chinook vary considerably with race (spring versus fall chinook) and stock (tules versus brights). Examination of the 1988 average nontreaty prices for gillnet chinook delivered on the Oregon side of the Columbia River demonstrates this:

Table IV-9. Ex-vessel values of inriver harvest of Columbia River salmon, 1988.^{a/b/}

Fishery	Species ^{c/}	Average Price Per Pound ^{d/}		Ex-vessel Value	
		1987	1988	1987	1988
<hr/>					
<u>OREGON</u>					
Nontreaty	Chinook				
Gillnet	Spring	\$3.15	3.23	\$ 506,551	782,765
	Fall Brights	1.53	1.99	5,081,983	8,815,646
	Tules	0.61	0.68	436,656	406,055
	Coho	1.95	2.20	1,652,182	4,024,900
	Sockeye	1.58	1.76	<u>105,916</u>	<u>58,008</u>
	Total			\$ 7,783,288	14,087,374
Treaty	Chinook				
All Gears	Spring	3.58	3.70	\$ 8,877	3,574
	Fall Brights	1.70	2.02	2,198,745	2,661,897
	Tules	0.50	0.54	14,865	21,958
	Coho	1.25	1.80	6,660	23,287
	Sockeye	1.52	2.06	<u>87,007</u>	<u>65,912</u>
	Total			\$ 2,316,154	2,776,628
<hr/>					
<u>WASHINGTON</u>					
Nontreaty	Chinook				
Gillnet	Spring	3.19	3.23	\$ 271,126	458,201
	Fall ^{e/}	1.49	1.83	2,904,019	2,475,051
	Coho	2.03	2.20	919,597	905,300
	Sockeye	1.58	1.76	<u>64,399</u>	<u>47,416</u>
	Total			\$ 4,159,140	3,885,969
Treaty	Chinook				
All Gears ^{f/}	Spring	3.58	3.70	12,443	11,596
	Fall ^{e/g/}	1.65	1.97	2,610,784	4,020,703
	Coho	1.40	1.80	13,441	67,793
	Sockeye	1.40	2.06	<u>128,426</u>	<u>181,494</u>
	Total			\$ 2,765,093	4,281,586
Columbia River Total				\$17,023,675	25,031,557

a/ Preliminary.

b/ Expressed in 1988 dollars and prices.

c/ Data for chums unavailable.

d/ Gillnet ex-vessel salmon prices are recorded in round weight and therefore are not strictly comparable to ex-vessel troll prices.

e/ Includes fall brights, tules, and jacks. Price change may reflect a change in the mix of brights, tules, and jacks rather than annual price changes.

f/ Includes Priest Rapids and Klickitat dipnet fisheries

g/ Includes catches in June and July.

- Spring chinook \$3.23 per pound, a 3 percent increase above 1987 prices
- Fall brights \$1.99 per pound, a 30 percent increase above 1987 prices
- Tules \$.68 per pound, an 11 percent increase above 1987 prices

The average Columbia River ex-vessel coho price was \$2.20 in the nontreaty gillnet fishery.

Ex-vessel Value

The total 1988 ex-vessel value for salmon harvested in the Columbia River was \$25,031,600.

The combined chinook and coho (nontreaty and treaty) ex-vessel value was up 48 percent over 1987. The ex-vessel value of commercial landings (nontreaty and treaty) of these two species was:

- chinook - \$19,657,400, a 40 percent increase compared to 1987
- coho - \$5,021,300, a 94 percent increase compared to 1987

Assessment of the 1988 Ocean Recreational Fishery

Recreational salmon fishing takes place primarily in one of two modes (1) anglers fishing from privately owned pleasure craft and (2) anglers employing the services of the charter boat fleet. Tables IV-10, IV-11, and IV-12 present the ocean recreational salmon catch and effort by boat type for recent years.

California

In 1988, 40 percent of the California angler trips were taken on charter boats. The total number of angler trips accounted for by the charter fleet was 97,000, a decrease of 8 percent compared to 1987 (Table IV-10). Statewide, effort by skiff (individually owned recreational vessels) fishermen was 11 percent lower than in 1987, but 54 percent above the 1976-1987 average.

Oregon

Trips taken by fishermen on charter boats accounted for 25 percent of the total ocean angler effort (Table IV-11). The number of charter boat related angler trips taken was 62,400, a 2 percent increase from 1987 but 16 percent above the 1979-1987 average. Private boat angler trips declined 3 percent from 1987 but were 1 percent above the 1979-1987 average number of trips.

Washington

The percent of the ocean angler trips taken on charter boats declined to 47 percent of total trips in 1988 (Table IV-12). The total number of ocean charter boat angler trips was 32,400, a 40 percent decrease from 1987. Private boat angler trips decreased by 23 percent to a total of 37,100. In the Columbia River area, losses in ocean recreational activity were at least partially offset by increases in Buoy 10 activity, particularly for the private boats. The combined Washington Buoy 10/ocean fisheries activity was up 3 percent to 181,800 trips.

Table IV-10. California ocean recreational salmon catch in thousands of fish and effort in thousands of angler trips by boat type, 1976-1988 with 1971-1975 average.^{a/}

Year	Angler Trips		Chinook Catch		Coho Catch	
	Charter	Skiff	Charter	Skiff	Charter	Skiff
1971-1975	102.5	139.3	105.5	64.1	12.2	36.1
1976	75.3	107.0	50.6	30.4	15.3	42.6
1977	80.7	101.9	54.7	49.6	2.4	11.8
1978	52.8	103.0	42.0	34.1	3.6	41.0
1979	78.7	85.2	71.8	40.6	2.0	14.5
1980	69.2	79.1	62.9	22.5	1.7	20.4
1981	61.1	66.9	59.6	24.2	0.2	9.5
1982	80.4	90.1	102.0	47.2	1.6	22.8
1983	46.2	65.4	44.8	17.3	0.2	26.7
1984	57.6	66.0	69.7	19.6	0.2	18.2
1985	87.9	97.7	96.8	63.8	0.9	14.4
1986	86.4	109.2	86.5	55.1	2.2	16.5
1987	105.0	163.3	121.8	70.7	4.3	43.0
1988	97.0	145.9	109.1	62.3	3.5	31.2

a/ Includes only San Francisco area charter boats from 1981-1985.

Table IV-11. Oregon ocean recreational catch in thousands of fish and effort in thousands of angler trips by boat type, 1979-1988 with 1979-1987 average.^{a/}

Year	Angler Trips		Chinook Catch		Coho Catch	
	Charter	Pleasure	Charter	Pleasure	Charter	Pleasure
1979-1987	53.9	185.7	5.7	22.2	58.65	129.7
1979	73.7	187.7	5.4	13.3	59.8	101.8
1980	79.0	218.9	5.1	11.9	98.3	207.5
1981	65.4	242.6	6.6	22.2	64.5	135.3
1982	43.3	182.7	8.2	30.6	48.5	126.7
1983	41.9	184.1	4.7	20.0	39.7	107.2
1984	24.3	128.7	2.2	14.8	27.3	96.1
1985	53.4	198.2	9.2	46.6	60.2	122.8
1986	43.7	142.8	4.0	18.4	71.1	140.5
1987	60.9	194.1	14.1	44.5	60.7	116.8
1988 ^{b/}	62.4	188.2	7.3	31.0	73.1	153.2

a/ Salmon data from surveyed ports only. For 1979-1980 this includes: Astoria, Garibaldi, Depoe Bay, Newport, Winchester Bay, Coos Bay, Gold Beach, and Brookings. Since 1981, Pacific City and Florence have been included. Excludes Columbia River estuary (Buoy 10) fishery.

b/ Preliminary.

Table IV-12. Washington ocean recreational salmon catch in thousands of fish and effort in thousands of angler trips by boat type, 1979-1988 with 1979-1987 average.^{a/}

Year	Angler Trips		Chinook		Coho		Pink	
	Charter	Private	Charter	Private	Charter	Private	Charter	Private
1979-1987 ^{b/}	107.0	67.6	36.7	12.7	129.2	67.3	1.7	2.0
1979	220.8	89.8	61.1	15.7	227.9	62.4	9.4	8.3
1980	193.9	86.2	41.1	12.5	288.4	73.1	0.1	-
1981	162.2	74.6	62.8	21.7	182.4	55.5	4.6	5.6
1982 ^{b/}	131.9	86.8	85.8	21.0	124.0	82.5	-	-
1983 ^{b/}	123.0	90.4	39.1	9.5	122.6	89.2	0.7	3.8
1984 ^{b/}	29.8	46.9	7.7	7.4	38.5	49.6	-	-
1985 ^{b/}	65.5	62.5	17.4	10.8	98.6	80.3	1.9	1.2
1986	56.5	53.0	13.3	7.9	98.0	77.7	-	-
1987 ^{c/}	53.6	48.3	27.6	12.9	65.8	58.6	0.4	1.4
1988 ^{c/}	32.4	37.1	11.2	7.8	46.1	43.6	-	-

a/ Source: Washington ocean salmon sampling program.

b/ Values for 1982-1985 include some inriver Columbia River fishing after closure of the ocean fishery.

c/ Preliminary.

Partial week closures were designed to encourage increased participation of anglers in non-salmon recreational fishing as well as extend the salmon season. Table IV-13 provides data on type of angler trips, by port, for 1984 through 1988. Although 1984 regulations did not include weekly closures, they were very restrictive, forcing users to choose between fishing for alternative species or pursuing nonfishing related activities during the longer than usual closure periods that summer.

Bottomfish charter boat trips increased in all Washington ports. The greatest increase, 2,800 additional trips, occurred out of Westport. Private boat bottomfish trips were generally down, except in La Push. Total Columbia River sturgeon effort was down 22 percent compared to 1987.

Assessment of the 1988 Buoy 10 Fishery

In 1988, anglers (including bank anglers) made 185,500 trips to the Buoy 10 fishery. This was a 49 percent increase compared to 1987 (Table B-21). Excluding bank anglers, approximately 58,300 Buoy 10 trips were made from the Oregon side, and 112,300 from the Washington side.

Charter boats operating from the Oregon side of the Buoy 10 fishery accounted for 7,300 trips, and private boat anglers made 51,000 trips. Charter and private boat angler trips increased 92 and 34 percent, respectively, compared to 1987 levels. Charter boat trips accounted for 13 percent of all Oregon side Buoy 10 angler trips in 1988, compared to 9 percent in 1987.

Charter boats operating from the Washington side of the Buoy 10 fishery accounted for 17,800 trips, and private boat anglers made 94,500 trips. Charter and private boat angler trips increased 78 and 47 percent, respectively, compared to 1987 levels. Charter boat trips accounted for 16 percent of all Washington side Buoy 10 angler trips in 1988, compared to 13 percent in 1987.

Community Impacts of the 1988 Ocean Troll and Recreational Fisheries on Coastal Communities

In many coastal towns in northern California, Oregon, and Washington where lumber, fishing, and tourism are the major industries, ocean, commercial, and recreational salmon fishing contribute significantly to local economies. The amount a commercial fisherman spends in order to harvest fish, a processor spends to prepare a consumer-ready product for market, or a recreationalist spends to take part in ocean fishing has an important impact on the local and regional economy. In addition, purchases made by the harvester, processor, or recreation-related businesses will cause suppliers to purchase additional inputs in the form of labor, more inventory, and other items. As workers and entrepreneurs receive wages, salaries, and profits from these activities, they spend money in the local area for a variety of goods and services. The total effect on the local economy depends upon the amount of the original dollar and the amount which is spent for subsequent purchases within the local economy. This effect is closely tied to the total amount of expenditures, the types of expenditures, and the structure of the local economy.

Table IV-13. Washington recreational salmon, bottomfish, and sturgeon angler trips by port and boat type for 1984-1988.

Year	Columbia River ^{a/}					Westport			La Push			Neah Bay		
	Charter	Private	Subtotal	Jetty	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total
<u>SALMON EFFORT (thousands of trips)</u>														
1984	18.0	36.1	54.0	-	-	11.6	2.3	13.9	0	0.2	0.2	0.3	8.4	8.6
1985	23.0	35.3	58.3	-	-	42.2	13.7	55.9	0	1.5	1.5	2.0	15.2	17.3
1986 ^{b/}	27.4	63.2	90.6	-	-	36.6	14.8	51.4	0	1.7	1.7	2.4	17.4	19.7
1987 ^{b/}	27.6	82.8	110.5	5.1	115.5	34.1	9.8	43.9	0	2.0	2.0	1.9	17.8	19.7
1988 ^{b/}	24.8	100.2	124.9	9.1	134.1	23.5	13.9	37.4	0	2.8	2.8	2.0	14.8	16.8
<u>BOTTOMFISH (thousands of trips)</u>														
1984	2.1	0.1	2.2	-	-	12.4	0.5	12.9	0	-	-	1.8	12.1	13.9
1985	1.8	0.2	2.0	-	-	15.3	0.9	16.2	0	0.1	0.1	3.0	9.9	12.9
1986 ^{b/}	1.6	0.1	1.7	-	-	19.3	0.8	20.1	0	0.2	0.2	3.5	10.8	14.2
1987 ^{b/}	1.4	0.3	1.7	0.5	2.3	20.2	1.2	21.4	0	0.5	0.5	5.6	15.5	21.1
1988 ^{b/}	1.9	0.2	2.1	0.8	2.9	23.0	1.0	24.0	0	0.7	0.7	5.7	14.3	20.0
<u>STURGEON EFFORT (thousands of trips)</u>														
1984	1.7	6.5	8.3	-	-	-	-	-	-	-	-	-	-	-
1985	3.4	8.3	11.7	-	-	-	-	-	-	-	-	-	-	-
1986 ^{b/}	3.5	8.3	11.8	-	-	-	-	-	-	-	-	-	-	-
1987 ^{b/}	4.7	11.2	15.9	-	-	-	-	-	-	-	-	-	-	-
1988 ^{b/}	5.2	7.2	12.4	-	-	-	-	-	-	-	-	-	-	-

a/ Columbia River effort includes inriver (Buoy 10) effort.

b/ Preliminary.

I/O Models

Economic I/O models are often used to estimate the impact of resource harvesting changes or to calculate the contributions of an industry to the local economy. The basic premise of the I/O framework is that each industry sells its output to other industries and finally to consumers who, in turn, purchase goods and services from other industries and primary factors of production. Therefore, the economic contribution of each industry to the local economy can be determined by changes in both final demand and the specific inter-industry relationships.

I/O models can be constructed using surveys of a regional economy. The disadvantages of a survey model approach are due to its complexity and high cost. Construction of a survey data I/O model involves obtaining data on the sectoral distribution of local purchases and sales to final demand of every sector of the economy, and on the imports purchased and exports sold by each sector. Another approach uses secondary data to construct estimates of local economic activity. For a review of the advantages and disadvantages of survey versus secondary data I/O models, see Radtke, et al.^{1/}

The model used to estimate impacts for the ocean salmon fishery for the years 1985-1988 utilizes one of the best known secondary I/O models available. The U.S. Forest Service has developed a computer program called IMPLAN which can be used to construct county or multi-county I/O models for any region in the U.S. The regional I/O models used by the U.S. Forest Service are derived from technical coefficients of a national I/O model and localized estimates of total gross outputs by sectors.^{2/} The computer program (IMPLAN) adjusts the national level data to fit the economic composition and estimated trade balance of a chosen region.

Sales and Local Income Multipliers

A common misuse of I/O analysis is in the application of sales and local income multipliers. A discussion of the methods for calculating output multipliers and income coefficients is included in Appendix E of the Council's "Review of 1985 Ocean Salmon Fisheries," March 1987. Readers are encouraged to review this discussion in order to correctly interpret the information provided below.

Fisheries Economic Assessment Model for Communities on the West Coast

I/O models have been constructed for many of the Pacific coast communities that are dependent on commercial and recreational fishing. Representative budgets from the fish harvesting and processing sectors and impact assessment

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- 1/ Radtke, Hans, Stan Detering, and Ray Broken, "A Comparison of Economic Impact Estimates for Changes in the Federal Grazing Fee: Secondary versus. Primary Data Input/Output Models." Western Journal of Agriculture Economics, 10(2):382-390.
 - 2/ Sieverts, Eric, Charles Palmer, and Ken Walters. Implan Users Guide U.S. Forest Service, Fort Collins, Colorado, September 1983.

models are taken from studies developed by Radtke and Jensen.^{3/} The budgets used in these reports reflect the expenditure patterns of the salmon fishermen who harvest the majority of the fish. These expenditures determine the economic impacts that the commercial fishery has on the community.

Similarly, budgets for recreational charter boats and recreational private boat fishermen developed by Crutchfield and Schelle^{4/} are used to estimate the community impacts of the recreational ocean fishery.^{5/} The procedure used is outlined in an ODFW report on ocean salmon fisheries.

Using Crutchfield and Schelle's information, expenditures for charter boat patrons of \$68.66 per day in 1988 were calculated. For private boat users these expenditures were \$52.02. The impacts per day that resulted from these expenditures vary a great deal between coastal communities, depending on the distribution of catch between private and charter boats and the size of the coastal community. The average impact per recreational ocean salmon fishing day, in 1988 dollars, ranges from \$38.26 for Ilwaco, Washington, to \$92.83 for San Francisco, California. Information is not available on the residential origin of recreational fishermen or the final destination of the processed fish product. Therefore, this analysis assumes that the fish harvested are "exported" out of the community and that the recreational fishermen's expenditures are "additional or new" to the community. For most community areas, except perhaps the San Francisco, California area, this is probably correct. The extent to which money spent by local sport fishermen is "new money" and not simply a diversion of money destined for other local purchases is not known and cannot be determined within the scope of this analysis. It can be argued that if the recreational fisherman did not have the opportunity to fish for salmon, he would spend that portion of his income on other local goods or services. On the other hand, it can also be argued that the fisherman who does not have the opportunity to fish for salmon in his local community will travel to other regions to fish. The local area would therefore lose those expenditures. For this analysis, we acknowledge the possible validity of both of these arguments. However, sufficient data on the origin of the recreational fisherman or the final destination of the processed product is not available.

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- 3/ Radtke, Hans and William Jensen. "Fisheries Economic Assessment Model," West Coast Fisheries Development Foundation, 1985. (Funded by the Saltonstall-Kennedy program through NMFS) and "Commercial Salmon Fishery Economic Assessment Model." Prepared for NMFS and the U.S. Small Business Administration, 1985.
 - 4/ Crutchfield and Schelle, "An Economic Analysis of Washington Ocean Recreational Salmon Fishing With Particular Emphasis on the Role Played by the Charter Vessel Industry," 1978.
 - 5/ "Progress Report on the Economic Aspects of the Recreational/Commercial Allocation of Coho Salmon in the Ocean Fisheries." ODFW, Portland, Oregon, 1985.

The estimated impacts of commercial and recreational salmon fishing for communities in Washington, Oregon, and California are shown in Tables IV-14, IV-15, and IV-16. The impacts presented are in terms of changes in total personal income generated in an area.

Commercial Ocean Troll Landings and Ocean Recreational Fishing

Coastal Community Income Impacts by Areas

Income impact estimates are based on the landings in the area and the inventory of fleet and processors. Ocean harvest which is not landed in the coastal area (e.g., landed in Puget Sound), is not included in these impacts. Therefore, coastal community income impacts may not follow the same trends as ex-vessel value. Additionally, because the fishing fleet is fairly mobile, the impacts for some specific areas may be overestimated.

For both the commercial and recreational fishery, 1988 was generally an improvement over 1987 for most of the California and Oregon coastal fishing ports. The Washington coastal areas suffered a general decline in both the commercial and recreational sectors. This decline was due in part to ocean harvested chinook being landed in Puget Sound. Compared to 1987, coastal area personal income attributable to the combined salmon fisheries was:

- o up 49 percent in California to \$105,723,000,
- o up 16 percent in Oregon to \$50,837,500, and
- o down 41 percent in Washington to \$ 5,986,200.

The 1988 total coastal area personal income impact for the west coast salmon fisheries was:

- o \$162,547,000;
- o 30 percent above the 1987 level of \$124,744,000, and
- o 59 percent above the 1976-1987 average of \$102,150,000.

California

Coastal area personal income generated as a result of commercial salmon fishing generally increased (Table IV-14). For the northern California coastal areas, Crescent City and Eureka, salmon landings decreased in 1988. Crescent City's personal income from commercial landings decreased by 48 percent compared to 1987, in Eureka the decrease was 16 percent. Overall, the personal income generated in California coastal communities from commercial ocean salmon fishing was 68 percent higher than in 1987, and 171 percent higher than the 1976-1987 average.

Total ocean salmon recreational fishing days decreased 9 percent, from 268,300 in 1987 to 243,000 days in 1988, but was 46 percent above the 1976-1987 average. The 1988 personal income generated from the ocean recreational salmon fishery decreased by 7 percent from 1987 and was 38 percent above the 1976-1987 average. All areas except Fort Bragg experienced a decline in angler days.

Table IV-14. California coastal local personal income impacts of troll and recreational ocean salmon fishery for major areas in 1987 and 1988 with 1976-1987 average.^{a/b/}

Year	Ocean Troll		Recreation Angler Days	Local Personal Income in Dollars	
	Chinook (pounds)	Coho (pounds)		Ocean Troll	Recreational

CRESCENT CITY					
1976-1987	354,500	222,200	25,000	\$2,010,700	\$ 1,092,600
1987	312,500	32,100	52,100	1,750,600	2,283,100
1988	187,500	18,600	43,900	910,200	1,924,100
EUREKA					
1976-1987	873,800	281,712	25,300	4,951,900	1,265,500
1987	655,900	66,500	46,100	3,915,300	2,312,400
1988	556,400	78,200	32,800	3,303,000	1,645,600
FORT BRAGG					
1976-1987	1,481,800	186,300	11,000	7,285,600	531,100
1987	3,115,100	139,600	14,000	15,185,000	675,200
1988	4,202,100	174,000	17,800	21,540,200	858,700
SAN FRANCISCO					
1976-1987	1,985,400	77,700	90,800	12,146,300	8,400,000
1987	3,874,000	6,800	108,400	25,755,200	10,059,800
1988	7,105,500	46,600	108,000	49,647,900	10,025,600
MONTEREY					
1976-1987	1,010,000	293,400	14,600	6,379,800	830,400
1987	1,089,700	700	47,700	6,244,400	2,718,800
1988	2,300,100	2,400	40,500	13,558,800	2,308,900
CALIFORNIA COAST TOTAL					
1976-1987	5,705,500	1,061,400	166,800	32,774,300	12,119,700
1987	9,047,200	245,700	268,300	52,850,400	18,049,300
1988	14,351,600	319,800	243,000	88,960,100	16,762,900

a/ Pinks not included.

b/ Expressed in 1988 prices and 1988 dollars to reflect current local impacts of such an average harvest.

Table IV-15. Oregon local personal income impacts of commercial and recreational ocean salmon fishery for major areas in 1987 and 1988 with 1976-1987 average.^{a/}

Year	Ocean Troll			Recreation ^{b/} Angler Days	Local Personal Income in Dollars	
	Chinook	Coho	Pink		Ocean	Recreational
	(pounds)	(pounds)	(pounds)		Troll	
<u>ASTORIA</u>						
1976-1987 ^{c/}	97,100	224,000	-	37,900	1,085,800	2,135,500
1987	84,100	57,700	641	17,100	686,000	966,700
1988 ^{d/}	33,400	16,900	-	5,700	272,100	248,700
<u>TILLAMOOK</u>						
1976-1987 ^{c/}	115,600	502,000	-	33,700	1,676,800	1,461,400
1987	418,800	377,900	14,206	29,100	3,317,400	1,267,400
1988 ^{d/}	340,600	763,100	-	33,200	5,461,600	1,452,200
<u>NEWPORT</u>						
1976-1987 ^{c/}	446,700	782,800	-	72,600	3,627,800	3,499,700
1987	995,800	518,400	14,800	76,900	6,486,200	3,717,200
1988 ^{d/}	1,217,900	1,358,300	-	89,600	13,102,700	3,860,000
<u>COOS BAY</u>						
1976-1987 ^{c/}	1,013,800	994,300 ^{d/}	-	78,672	6,630,700	3,728,700
1987	2,995,200	892,800	54,000	62,500	18,304,400	2,972,600
1988 ^{d/}	2,193,900	1,088,600	-	69,000	17,700,900	3,338,200
<u>BROOKINGS</u>						
1976-1987 ^{c/}	575,800	204,800	-	62,600	2,374,700	2,472,700
1987	685,900	68,800	3,700	69,400	3,292,500	2,748,000
1988 ^{d/}	580,300	105,600	-	53,100	3,323,400	2,077,800
<u>OREGON COAST TOTAL</u>						
1976-1987 ^{c/}	2,248,900	2,707,900	-	285,500	15,395,800	13,297,500
1987	5,179,800	1,915,600	87,300	255,000	32,086,500	11,671,900
1988 ^{d/}	4,366,100	3,332,500	-	250,600	39,860,700	10,976,900

a/ Expressed in 1988 prices and 1988 dollars to reflect the current local impacts of such an average harvest.

b/ Florence, Reedsport, and Bandon are included with the Coos Bay area. Garibaldi, Netarts, and Pacific City are included with the Tillamook Area. Depoe Bay is included in the Newport area. Port Orford and Gold Beach are included in the Brookings Area. Gearhart/Seaside and Cannon Beach are included in the Astoria Area.

c/ Pinks not included.

d/ Preliminary.

Table IV-16. Washington coast local personal income impacts of nontreaty troll and recreational ocean/salmon fishery for major areas in 1987 and 1988 with 1976-1987 average.^{a/}

Year	Ocean Troll			Recreation Angler Days	Local Personal Income in Dollars	
	Chinook (pounds)	Coho (pounds)	Pink (pounds)		Ocean Troll	Recreational
<u>NEAH BAY/LA PUSH</u>						
1976-1987 ^{b/}	264,600	609,300	-	44,800	\$ 4,483,400	\$ 2,606,500
1987	45,200	10,400	6,700	21,800	303,900	1,273,000
1988	121,600	0	0	19,500	676,100	955,300
<u>WESTPORT</u>						
1976-1987 ^{b/}	685,900	751,000	-	128,200	5,605,000	9,896,200
1987	314,200	112,100	600	43,900 ^{c/}	1,981,800	3,400,600
1988	238,700	0	0	37,300	1,110,000	2,224,300
<u>ILWACO</u>						
1976-1987 ^{b/}	154,300	316,800	-	97,200	1,468,100	4,385,600
1987	60,600	44,400	300	56,600	505,300	1,678,100
1988	25,100	0	0	12,600	135,500	482,100
<u>OTHER AREAS</u>						
1976-1987 ^{b/}	-	-	-	-	-	-
1987	120,100	45,400	2,700	-	943,000	-
1988	72,900	0	0	-	402,900	-
<u>WASHINGTON COAST TOTAL</u>						
1976-1987 ^{b/}	1,119,700	1,683,900	-	268,500	11,675,500	16,887,700 ^{d/}
1987	540,100	212,300	10,300	102,100	3,734,000	6,351,700
1988	458,200	0 ^{e/}	0	69,500	2,324,500	3,661,700

a/ Expressed in 1988 prices and 1988 dollars to affect the current local impact of such an average harvest.

b/ Pinks not included.

c/ Approximately 5,600 angler days were expended by Westport based fishermen fishing in the Columbia River catch area between August 9 and August 20.

d/ Includes effort expended in Buoy 10 area fishery by Washington based anglers through 1986.

e/ Approximately 19,600 pounds of coho were caught outside of the north of Cape Falcon management area, but landed in Washington. Impacts for these landings are not included in these totals.

Oregon

Overall the Oregon coast personal income generated by commercial salmon fishing increased from \$32,086,500 in 1987 to \$39,860,700 in 1988, a 24 percent increase. Compared to the 1976-1987 average this was a 159 percent increase (Table IV-15).

Chinook landings generally were down except for the Newport area where chinook landings increased from 995,800 pounds to 1,217,900 pounds, a 22 percent increase. All areas except Astoria experienced increases in coho landings.

Recreational days on the Oregon coast in 1988 decreased from 1987. The decrease came from the northern (Astoria) and southern (Brookings) part of the state. The Astoria ocean angler days decrease was the greatest, 67 percent below 1987 levels.

The Oregon coast experienced a total recreational fishery related personal income decrease of 6 percent. The total coastal income impact, \$10,976,900, is within 17 percent of the 1976-1987 average of \$13,297,500.

Washington

The total personal income generated in the Washington coastal area by the nontreaty troll fleet was \$2,324,500, a decrease of 38 percent from 1987 and a decrease of 80 percent from the 1976-1987 average. However, examination of Table IV-8 shows an increase in 1988 ex-vessel value compared to 1987. The difference is accounted for by deliveries made outside the coastal areas, mainly in Puget Sound ports. Only the Neah Bay/La Push areas experienced an increase in chinook landings, 169 percent. All of the other areas had lower landings (Table IV-16).

The recreational personal income impacts were reduced due to a decline in angler days and a shift from charter to private boat fishing. Recreational income impacts decreased 42 percent to \$3,661,700 from \$6,351,700 in 1987. This is a 78 percent decrease compared to the 1976 to 1987 average.

Columbia River Gillnet Income Impacts

The nontreaty gillnet fishery on the Columbia River generated a substantial amount of community income to the Oregon and Washington communities on the Columbia River. The 9,064,700 pounds of landed nontreaty gillnet salmon generated an estimated \$33,317,200 of personal income in 1988 to the Columbia River communities (Table IV-17). Total nontreaty poundage was up 19 percent, resulting in a personal income increase of 23 percent compared to 1987.

Factors Affecting Income Generated

There are basically five factors that affect the amount of personal income that is generated by a given amount of fish harvested and processed. These five factors are (1) landed price per pound, (2) yield of product, (3) sales price of the processed product, (4) spending patterns within the region, and (5) the size of the local or regional economy. The relationships of each of these factors to the magnitude of the impact of the salmon troll fishery on the local economy is described.

Table IV-17. Local personal income impacts of the commercial salmon gillnet fishery by Oregon and Washington Columbia River communities 1988.^{a/}

Species	Pounds		Local Personal Income Impact in Dollars ^{b/}	
	1987	1988	1987	1988
<u>OREGON</u>				
<u>Nontreaty Gillnet</u>				
Chinook				
Spring	160,878	242,342		
Fall Brights	3,315,269	4,429,973		
Tules	714,554	597,140		
Coho	848,491	1,829,500		
Sockeye	<u>66,837</u>	<u>32,959</u>		
TOTAL	5,106,029	7,131,914	\$17,443,100	\$26,181,800
<u>Treaty All Gears</u>				
Chinook				
Spring	2,477	966		
Fall Brights	1,294,429	1,317,771		
Tules	29,900	40,663		
Coho	5,314	12,937		
Sockeye	<u>57,146</u>	<u>31,996</u>		
TOTAL	1,389,266	1,404,333	\$ 5,540,400	\$ 5,065,700
<u>WASHINGTON</u>				
<u>Nontreaty Gillnet</u>				
Chinook				
Spring	84,990	141,858		
Fall ^{c/}	1,947,082	1,352,487		
Coho	452,990	411,500		
Sockeye	<u>40,638</u>	<u>26,941</u>		
TOTAL	2,525,700	1,932,786	\$ 9,752,900	\$ 7,135,300
<u>Treaty All Gears^{d/}</u>				
Chinook				
Spring	3,472	3,134		
Fall ^{c/}	1,585,335	2,040,966		
Coho	9,613	37,663		
Sockeye	<u>91,847</u>	<u>88,104</u>		
TOTAL	1,690,267	2,169,867	\$ 6,813,200	\$ 7,857,100
<u>COLUMBIA RIVER TOTAL</u>				
	10,711,262	12,638,900	\$39,549,700	\$46,240,000

a/ Preliminary.

b/ Expressed in 1988 dollars.

c/ Includes fall brights, tules, and jacks.

d/ Includes Priest Rapids and Klickitat dipnet fisheries.

- **Landed Price Per Pound** - The amount of revenue that a commercial fisherman received determines how much he spends on wages, supplies, and household items.
- **Yield of Product** - The cost of raw product is in direct relationship to the recovery that a processor can obtain from the fish he received.
- **Sales Price of Processed Product** - The sales price and yield determine the processor's gross margin. Gross margin is the amount he uses to pay wages, buy supplies, and create a return or profit. The gross margin is very dependent on the degree of processing it takes to create a market ready product.
- **Spending Patterns in the Local Economy** - The way harvesters or processors spend their revenues is dependent on their production process and on the inventory of the fishing fleet and processing plants in a given area. If much of the expenditures are for an out of area import such as gasoline, the impacts will be different than if most of the expenditures are for crew share payments for local area residents.
- **Size of the Local or Regional Economy** - The structure and size of the economy will also influence the final impact. A larger area generally has more businesses, thus a given dollar circulates more widely, generating more personal income in the local area.

Troll salmon (coho and chinook) are landed semiprocessed. The yield for the processor is therefore high. For example, in an average coastal community the contribution to personal income may be \$4.68 per pound for coho and \$5.78 per pound for chinook. The rest of the state would gain additional \$1.40 and \$1.72 of income per pound for coho and chinook, respectively, as the expenditures "leak out" of the community. In total, a state could expect to gain \$6.08 of income per pound of coho landed and \$7.50 of income per pound of chinook landed.

The term "economic multiplier" is often misused because the point of analysis is not clearly defined. Because most of the seafood harvested in coastal communities leaves these communities as a processed product, the point of analysis at which to determine the multiplier effect should be the volume and value of the processed product. However, landings volume and landings values are the most readily available data. We have therefore developed landed price to total local income relationships for representative coastal community. These are for 1988.

	Landed Price	Local Impact	Ratio
Troll Coho	2.28	4.68	1/2.1
Troll Chinook	3.05	5.78	1/1.90

The information on total income generated per landed pound or landed price to local impact relationships can be used to make general estimates of income contribution of fish harvesting and processing. It is important to note, however, that any variation in any of the major factors discussed earlier will cause a change in any of these relationships.